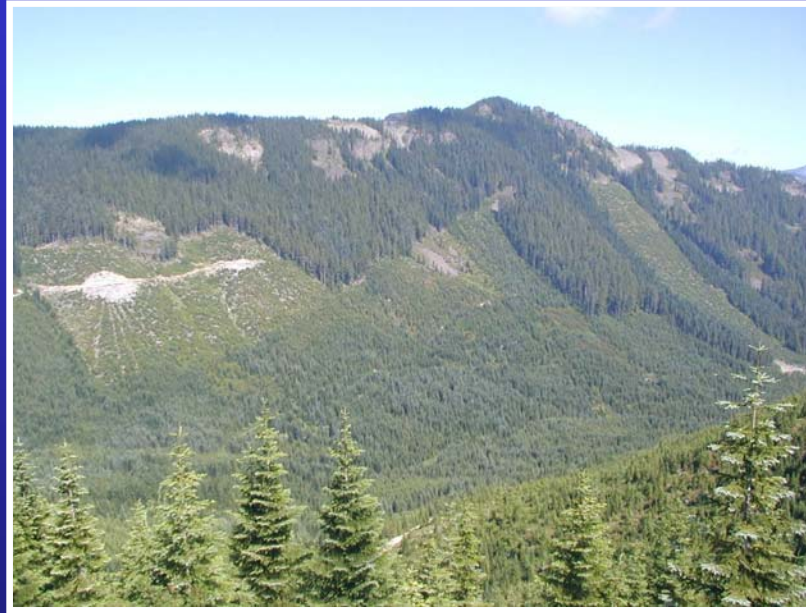


# WATERSHED RESTORATION PROGRAM OVERVIEW



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# Cedar River Watershed Habitat Conservation Plan (HCP)

- Endangered Species Act and “Incidental Take”
- Prescribes legally required watershed restoration and protection measures
- 83 species
- Other HCP components:
  - River flows, Landsburg fish blockage



# HCP: Watershed Management

- Road decommissioning and improvement
- Aquatic and riparian restoration
- No commercial timber harvest
- Upland forest habitat restoration
  - *Protection (landscape and site)*
  - *Thinning*
  - *Planting*
- Adaptive management: learning model



# Context: A Few Watershed Facts

- Primary water supply for 1.3 million people
- Logging history: 1880s through 1993
- Current forest conditions
  - *13,889 acres native forest (~200-800+ years old)*
  - *71,500 acres previously logged second growth (~10-120 years old)*
- Elevation range:  
~550-5550 feet



Reservoir complex, ca 1930



# Goals of Watershed Restoration

Protect and improve  
drinking water quality



Protect and restore  
biodiversity

# Goals of Upland Forest Habitat Restoration

- Accelerate development of late-successional and old-growth forest conditions
- Improve habitat for species of concern
- Reduce risk of catastrophic damage
  - *Water quality*
  - *Habitat*

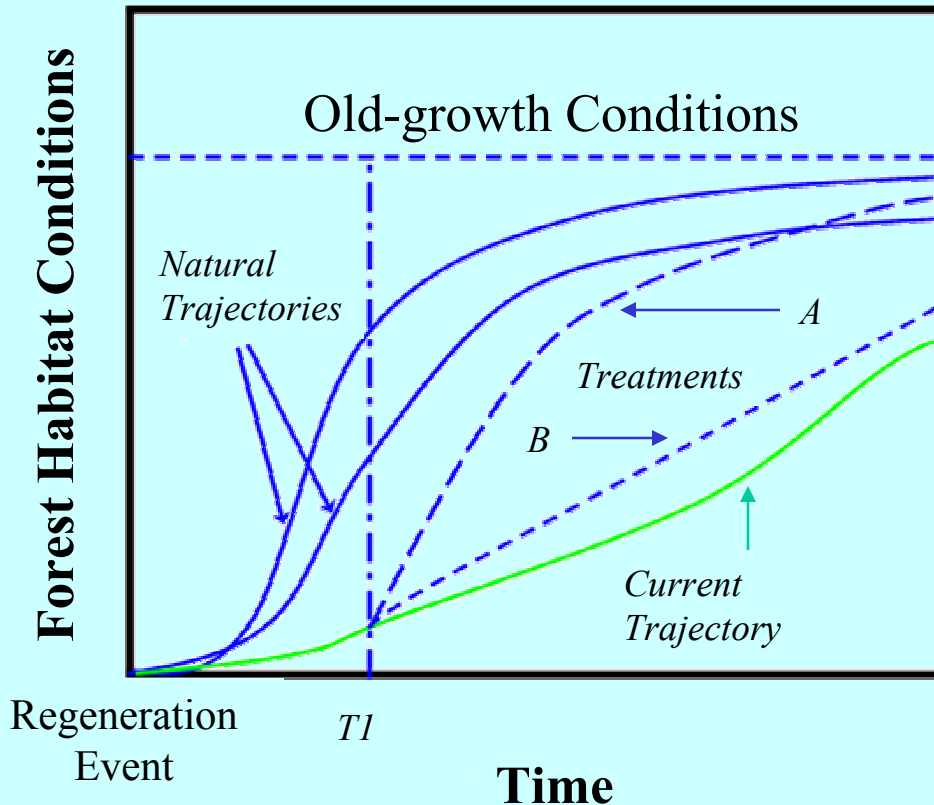


# Why is Restoration Needed?

- 71,500 acres logged previously
- As much as 2/3 estimated to be poor habitat for species of concern & developing slowly

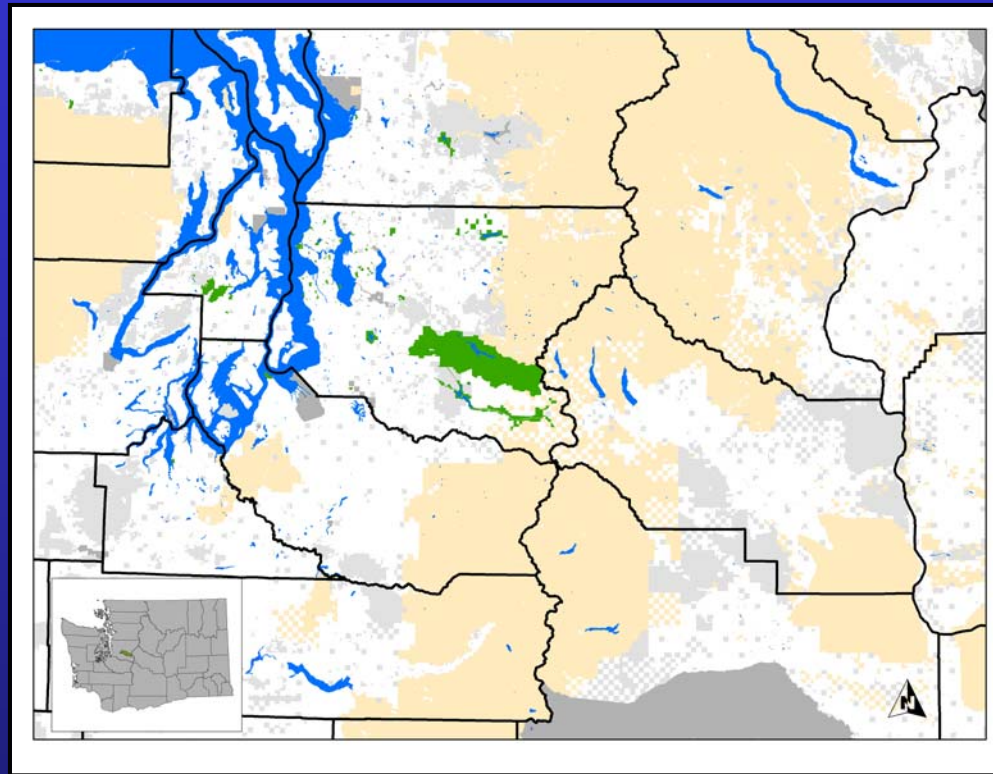
	AFTER NATURAL DISTURBANCE	AFTER HARVEST
BIOLOGICAL LEGACIES	Dead wood, live trees	Few
TREE DENSITY	Variable, some low	Very high
TREE SPACING	Variable	Uniform if planted
SPECIES DIVERSITY	Variable, often high	Low

# Conceptual Model of Forest Habitat Development

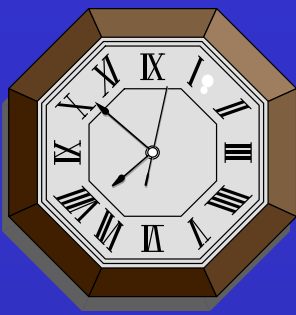




# Regional Context

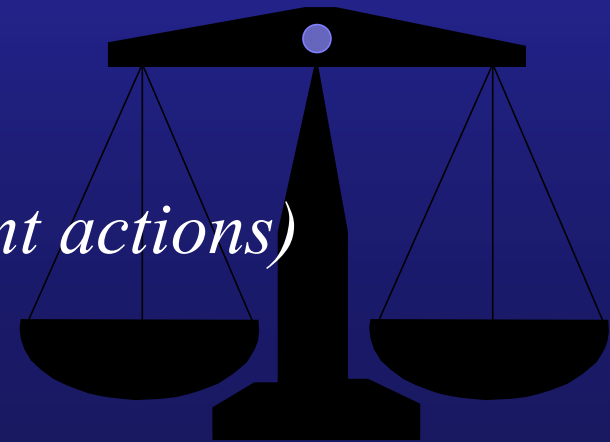


- Late-successional and old-growth forest habitats at low to middle elevations
- Unique opportunity



# Time as a Concern

- Regional amount of late-successional forest habitats at low to middle elevations
  - *Extremely limited as result of development and short-rotation timber harvest*
- Sources of species for recolonization
  - *Limited and declining*
- Essentially a trade-off of risks
  - *Taking action (or taking different actions)*
  - *Not taking action*



# Landscape Planning Objectives

- Find:
  - *Optimum pattern of intervention and protection (non-intervention) over space and time*
- To:
  - *Achieve greatest benefit*
- Focusing On:
  - *Natural processes*
- Using:
  - *Best available science*
    - Addressing uncertainty



# Framework for Restoration: Nature Conservancy Model

- Identify:
  - *Existing conditions of habitats*
  - *Threats*
- Define: explicit desired future conditions
  - *Key ecological attributes*
- Use:
  - *Models of key ecological processes*
  - *Tools for restoration*



# TNC Model (cont'd)

Basic challenge: How to get from here to there

- Address uncertainties:  Learning model
  - *Key indicators of progress*
  - *Gaining knowledge over time*
    - Analysis and research in short term
    - Adaptive management over longer term
- Manage risks:
  - *Do different things (hedge your bets)*
  - *Be conservative*
  - *Leave many areas alone*

# Scale of Intervention

- HCP estimates of second-growth upland forest to be treated over 50-year term of HCP

<i>Treatment</i>	<i>Age</i>	<i>Total Acres</i>	<i>% of forest</i>
Restoration thinning	10-30 (or 40)	10,480	14.7%
Restoration planting	Any	1,000	1.4%
Ecological thinning	30-60+	2,000	2.8%
<i>All</i>		<i>13,480</i>	<i>18.9%</i>

- Numbers not derived by assessment of need
- Habitat needs of some species
- Importance of time

Northern spotted owl



# Ecological Thinning: Financial Context

- No cutting for commercial purposes
- Sell logs only if ecological objectives met
- Revenues dedicated to offset cost of HCP
  - *Additional restoration*
  - *Ongoing HCP costs*
- Budget constraints



# Questions: Cutting in Older Forest

- Procedural
  - *Financial incentive? (trust)*
  - *Financial risk and budget*
  - *Doing it right (contract, compliance)*
- Roads:
  - *Why not take out roads after restoration?*
- Ecological
  - *Why cut any of the larger trees?*
  - *Why remove trees from a site?*
  - *Why cut trees over 50 years old?*
  - *Why more than 62 acres for a project?*